Overview of the Federal Clinger-Cohen Assessment

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Mrs. Sandra Smith
Lead, DON IM/IT Workforce Management

Office of the Department of the Navy Chief Information Officer (DON CIO)

Discussion Topics

- Overview of the Federal Clinger-Cohen Assessment (CCA) Survey for the IT workforce
- Comparisons across government
- DON IM/IT Workforce Findings
- Next Steps
- Federal Perspective: Moving Toward Enterprise Human Capital Planning

Clinger-Cohen IT Workforce Skills Assessment (CCA) Survey

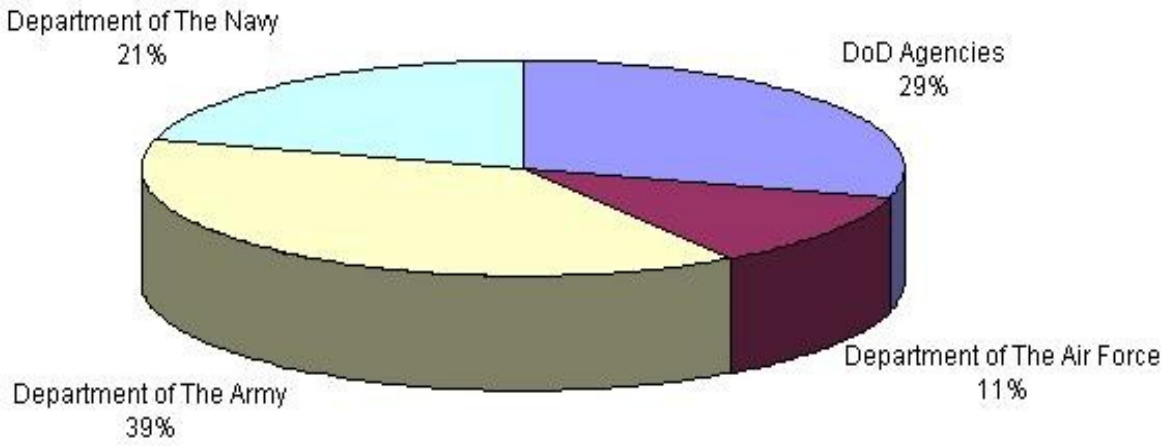
- Sponsored by the Federal Chief Information Officer's (CIO) Council, Office of Management and Budget (OMB), and Office of Personnel Management (OPM)
- First federal-wide IT workforce skills assessment survey launched during September 2003
- Satisfies Clinger-Cohen Act and eGovernment Act requirement to assess IT workforce and analyze personnel needs.
- Aligns DON IM/IT workforce efforts with those of Federal government, OPM, and DoD
- Focused on Government Civilians; military and contractors not surveyed

Survey Background & Methodology

- Web-based; respondents generally took 15-20 minutes to complete; covered 5 areas:
  - Demographics
  - Competencies (53 technical and 16 general)
  - IT-related Skills (80)
  - IT-related Certification Areas (46)
  - Specialized Job Activities (10)
- Self-selecting sample (not random)

Breakout of Responses at the DoD Level

Organization	#Responses
Department of Defense - Total	6390
DoD Agencies	1884
Department of The Air Force	719
Department of The Army	2454
Department of The Navy	1333



- Fairly well balanced across DoD agencies and the Military Departments
- Total population, number of responses (sample size) and response rate provided in separate spreadsheet

Demographics – DoD Key Findings

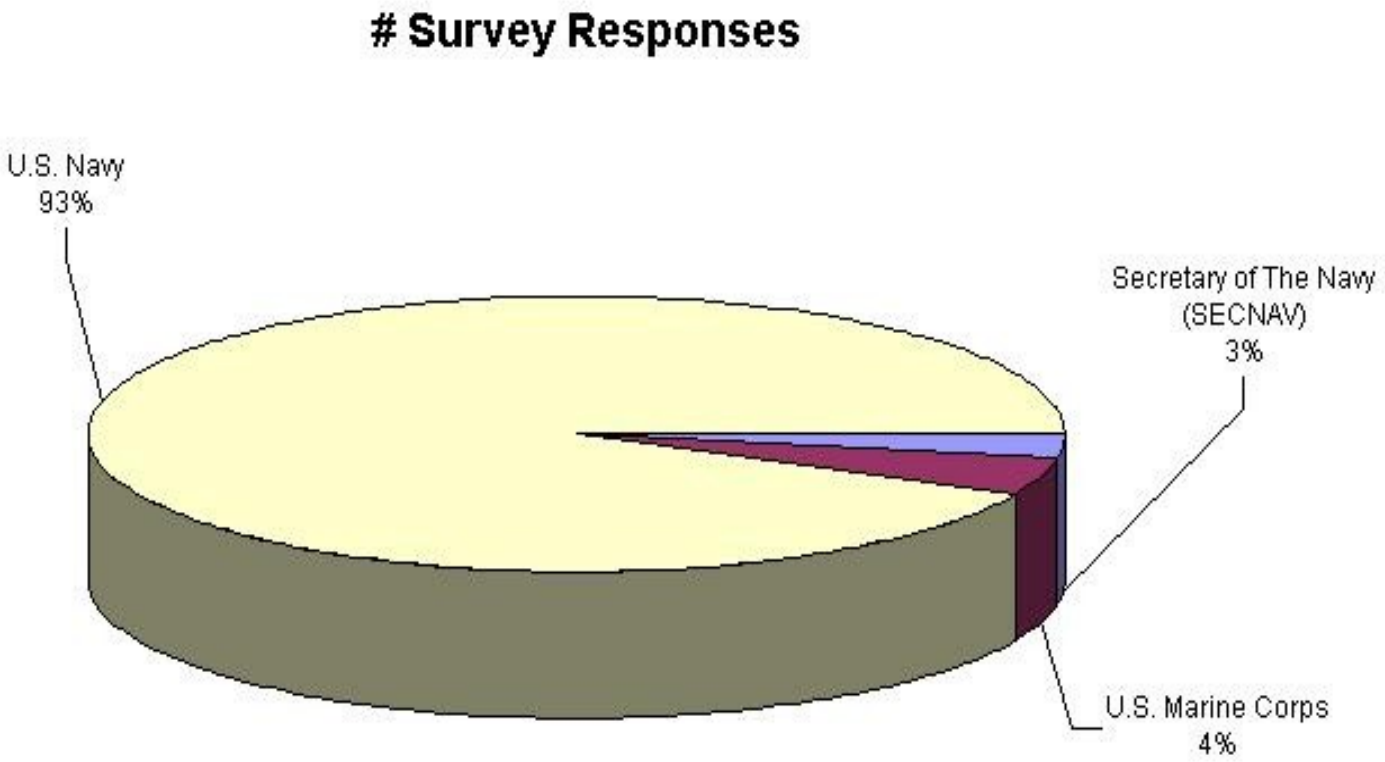
The Average DoD IT Worker…
…is between 46 and 50 years of age
…is a GS-12
…has over 20 years of Federal Government experience
…has little to no private sector experience
…is likely to retire in the next 10 to 20 years, but may move to a different organization in the next 4-6 years
…holds a Bachelor's Degree

- Based on the survey responses, and concentrating solely on the demographic information that respondents provided, a profile of the "Average IT Worker" within DoD emerges
- ***Federal Government Comparison:*** Differences are very slight:
  - Is slightly less senior (GS-12 compared to GS-13)
  - Indicates slightly more willingness to stay within their organization (may leave in 4-6 years vice 0-3 years)

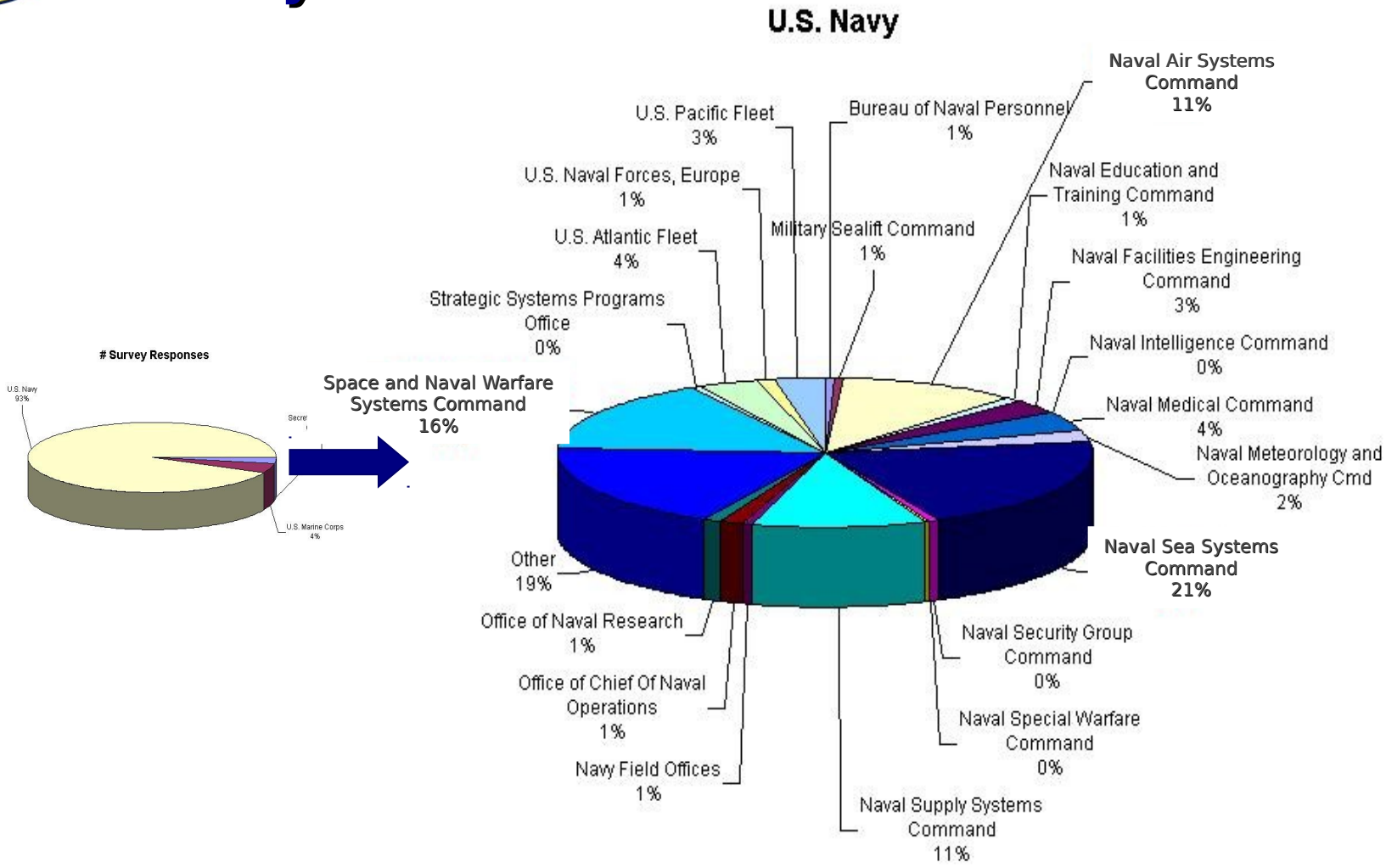
DON Overall Survey Responses

- Target audience was civilians performing IT and IT-related functions
- Federal data source (OPM's FedScope) was used to assist in determining organizational breakdown and validation in terms of number of incumbents in various occupational series
- One email was sent inviting DON civilians to take the survey
- Personnel identified by series (aligned to Federal approach)
  - Traditional IT-related series (GS-2210, GS-334, GS-391, GS-854,GS-1550)
  - Non-traditional IT series (GS-301, GS-340, GS-343 GS-855, and "Other")
- Total responses: 1,333 responses
- Technical challenges for Marine Corps respondents

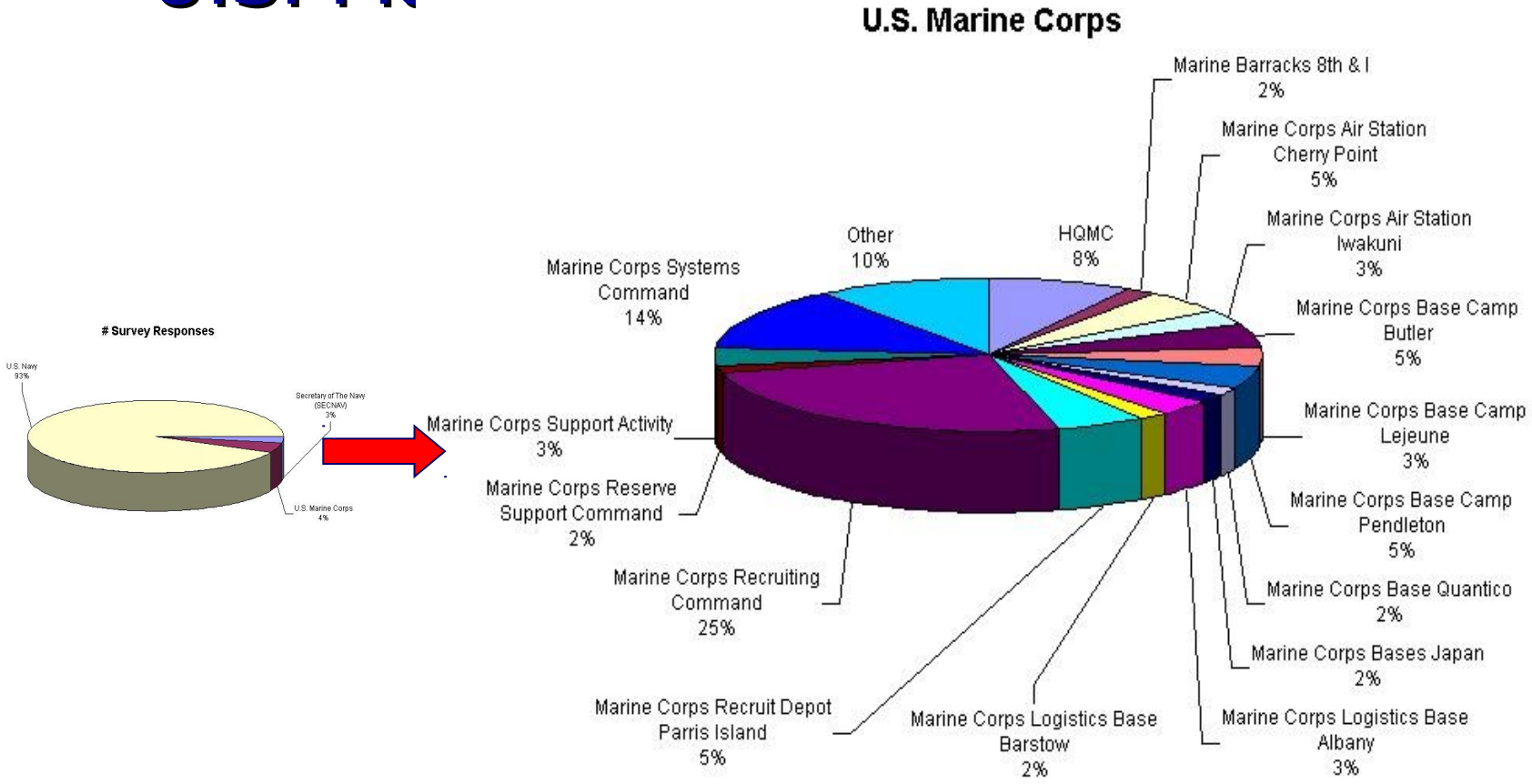
Breakout: Responses at the DON Level



Breakout: Responses by U.S. Navy


U.S. Navy
Survey Responses
U.S. Navy 93%
U.S. Marine Corps 4%
Space and Naval Warfare Systems Command 16%
Naval Air Systems Command 11%
Bureau of Naval Personnel 1%
U.S. Pacific Fleet 3%
U.S. Naval Forces, Europe 1%
Naval Education and Training Command 1%
Military Sealift Command 1%
U.S. Atlantic Fleet 4%
Naval Facilities Engineering Command 3%
Strategic Systems Programs Office 0%
Naval Intelligence Command 0%
Naval Medical Command 4%
Naval Meteorology and Oceanography Cmd 2%
Naval Sea Systems Command 21%
Other 19%
Office of Naval Research 1%
Naval Security Group Command 0%
Office of Chief Of Naval Operations 1%
Naval Special Warfare Command 0%
Navy Field Offices 1%
Naval Supply Systems Command 11%

Breakout: Responses by U.S. Marine Corps


U.S. Marine Corps
Survey Responses
U.S. Navy 93%
Secretary of The Navy (SECNAV) 3%
U.S. Marine Corps 4%
Marine Barracks 8th & I 2%
Marine Corps Air Station Cherry Point 5%
Marine Corps Air Station Iwakuni 3%
Marine Corps Base Camp Butler 5%
Marine Corps Base Camp Lejeune 3%
Marine Corps Base Camp Pendleton 5%
Marine Corps Base Quantico 2%
Marine Corps Bases Japan 2%
Marine Corps Logistics Base Albany 3%
Marine Corps Logistics Base Barstow 2%
Marine Corps Recruit Depot Parris Island 5%
Marine Corps Recruiting Command 25%
Marine Corps Reserve Support Command 2%
Marine Corps Support Activity 3%
Marine Corps Systems Command 14%
Other 10%
HQMC 8%

Demographic Profile of the “Average IT Worker” within the DON

Based on the survey responses, and concentrating solely on the demographic information that respondents provided, a profile of the “Average IT Worker” emerges

DON Technical Competency Proficiency Summary

- **The survey asked respondents to self-assess their current proficiency in a set of 53 technical competencies**
- **Competencies ranked using a weighted score to determine the average**
- **Table illustrates ten highest and lowest rated competencies**

Competency	Type	Average Score	Rank
Configuration Management	Technical	3.16	1
Hardware	Technical	3.11	2
Operating Systems	Technical	3.02	3
Computer Languages	Technical	2.94	4
Software Development	Technical	2.90	5
Technical Documentation	Technical	2.83	6
Data Management	Technical	2.77	7
Requirements Analysis	Technical	2.74	8
Database Management Systems	Technical	2.71	9
Project Management	Technical	2.71	10
Information Technology Research & Development	Technical	2.04	44
Encryption	Technical	1.98	45
Telecommunications	Technical	1.91	46
Accessibility	Technical	1.91	47
Computer Forensics	Technical	1.88	48
Human Factors	Technical	1.88	49
Capital Planning and Investment Assessment	Technical	1.82	50
Modeling and Simulation	Technical	1.73	51
Artificial Intelligence	Technical	1.45	52
Embedded Computers	Technical	1.37	53

DON General Competency Proficiency Summary

- **The survey asked respondents to self-assess their current proficiency in a set of 16 general competencies**
- **The table ranks all general competencies – based on the average proficiency score**

Competency	Type	Average Score	Rank
Interpersonal Skills	General	3.77	1
Problem Solving	General	3.77	2
Customer Service	General	3.51	3
Decision Making	General	3.45	4
Oral Communication	General	3.42	5
Leadership	General	3.33	6
Planning and Evaluation	General	3.28	7
Organizational Awareness	General	3.23	8
Influencing/Negotiating	General	2.87	9
Administration and Management	General	2.58	10
Strategic Thinking	General	2.54	11
Managing Human Resources	General	2.53	12
Public Safety and Security	General	2.44	13
Financial Management	General	2.16	14
Legal, Government and Jurisprudence	General	2.00	15
Contracting/Procurement	General	1.99	16

DON Skill Proficiencies Summary

- **The tables provides the top and bottom 10 skills out of a total of 80 skills, based on an average score**

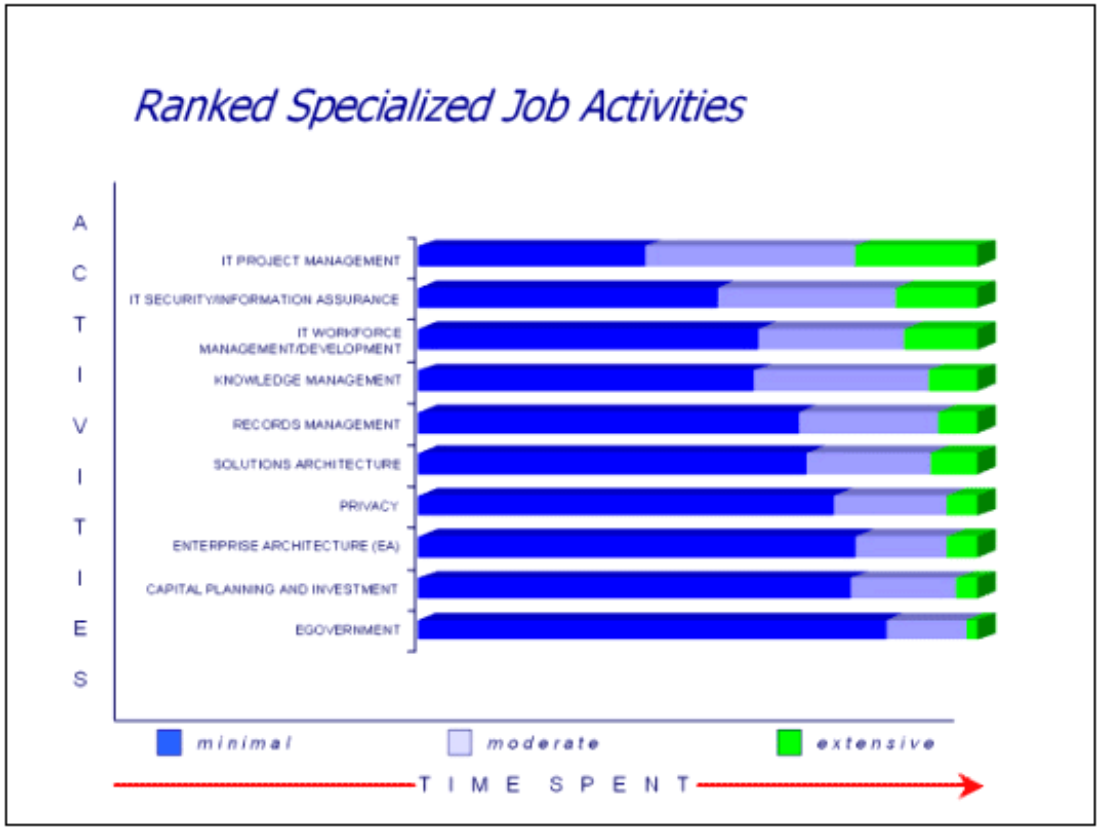
Skill	Average Score	Rank
Word Processing Software	2.13	1
Electronic Mail	2.03	2
Spreadsheet Software	1.67	3
Flowcharting	1.64	4
Data Flow Diagrams	1.56	5
Internet Browsers	1.56	6
Browsers	1.52	7
Client-Server	1.52	8
File systems	1.51	9
Data Analysis	1.51	10

Enterprise Portal Development	0.49	71
Video Imaging	0.47	72
Portal Development	0.47	73
Animation	0.44	74
UML	0.42	75
Sound Editing	0.36	76
Federal/OMB Enterprise Architecture	0.34	77
Virtual Reality	0.31	78
Biometrics	0.27	79
JAD	0.24	80

DON Specialized Job Activities

Ten specialized job activities were identified by experts as top IM/IT priorities

- **Ten Key specialized job activities identified**
- **The survey asked respondents to estimate the amount of time they spend (extensive, moderate, or minimal or none) on all "specialized job activities"**
- **The following table orders the top activities based on the number and percentage of responses per activity**



DON Specialized Job Activities Overview

ACTIVITY NAME	COMPETENCIES	SKILLS	CERTS	RANK
IT PROJECT MGMT	ADEQUATE	MAY NEED WORK	9% FOR EXTENSIVE	1
IT SECURITY/IA	STRONG	MIXED RESULTS	9% FOR EXTENSIVE	2
IT WORKFORCE DEVELOPMENT/MGMT	STRONG	ADEQUATE	N/A	3
KNOWLEDGE MGMT	STRONG	MAY NEED WORK	N/A	4
RECORDS MGMT	STRONG	STRONG	7% FOR EXTENSIVE	5
SOLUTIONS ARCH	STRONG	MIXED RESULTS	2% FOR EXTENSIVE	7
PRIVACY	STRONG	MAY NEED WORK	10% FOR EXTENSIVE	6
ENTERPRISE ARCH (EA)	STRONG	MIXED RESULTS	N/A	8
CAPITAL PLANNING AND INVESTMENT	STRONG	CRITICAL DEVELOPMENT NEED	N/A	9
eGOVERNMENT	STRONG	MIXED RESULTS	10% FOR EXTENSIVE	10

Key: Strong Adequate Mixed results May need work Possible critical development need

Discussion of IA Specialized Job Activity

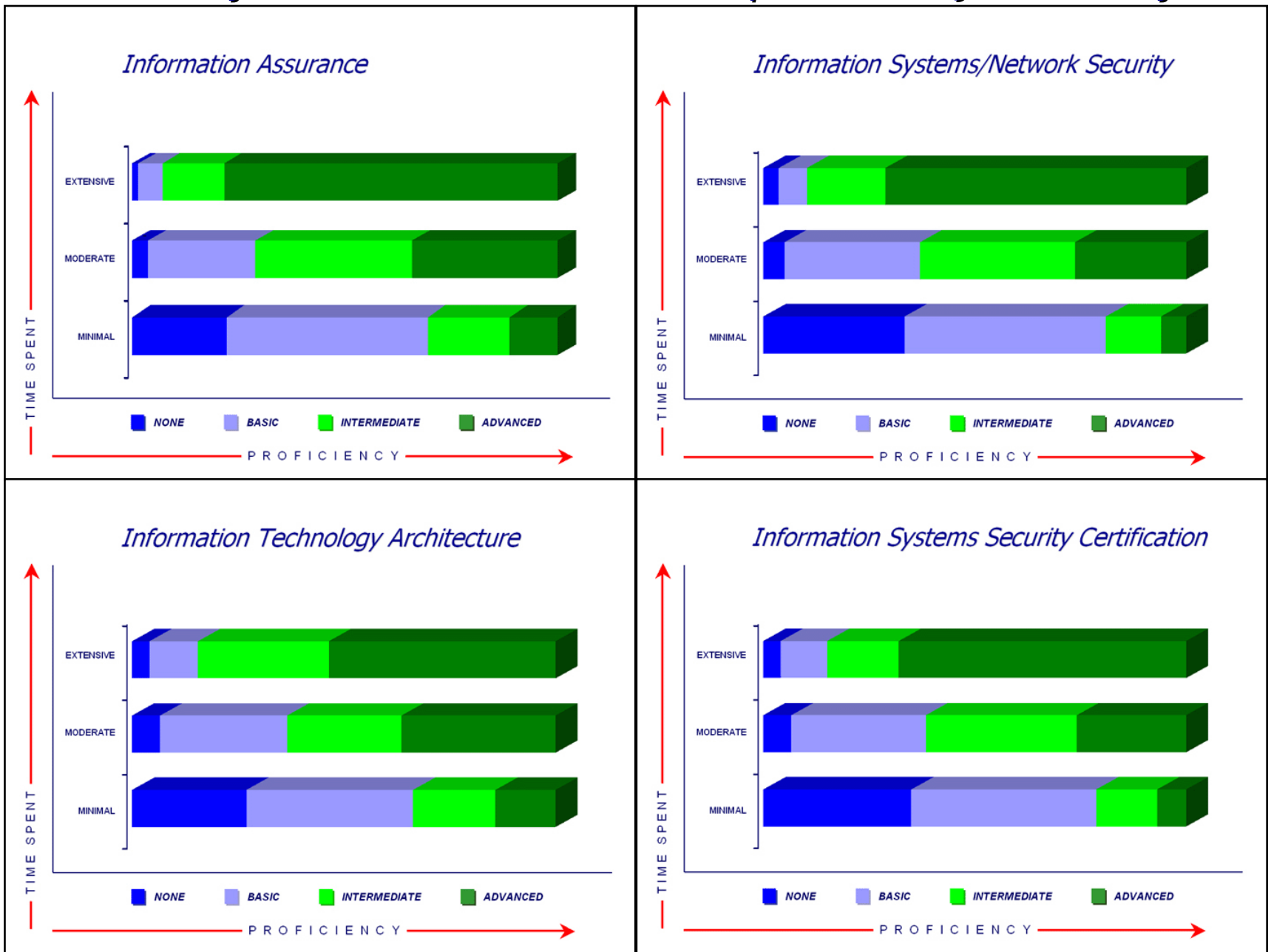
Results: IA-Related Competencies

- Using a five point scale, respondents rated their current proficiency in a set of IA-related competencies; table below shows average scores
- With a score of 2.5 being considered "average", most IA-related competency proficiencies scored somewhat below average (DON workforce as a whole)

Proficiency	Description
0 - None	Do not possess proficiency
1 - Basic	Capable of handling only the simplest assignments, but will need significant assistance beyond the easiest situations
2 - Foundational	Capable of handling some assignments, but will need assistance beyond routine situations
3 - Intermediate	Capable of handling many day-to-day assignments, but may seek assistance in difficult situations
4 - Advanced	Capable of handling most day-to-day assignments, though may seek expert assistance with particularly difficult situations
5 - Expert	Capable of handling all assignments and may serve as a role model and/or coach others on this competency

Competency	Average Score
Standards	2.68
Capacity Management	2.50
Information Assurance	2.47
Risk Management	2.35
Information Technology Architecture	2.34
Web Technology	2.31
Network Management	2.29
Information Systems/Network Security	2.12
Information Systems Security Certification	2.09
Information Technology Research & Development	2.04
Encryption	1.98
Computer Forensics	1.88

Sample Analysis of Competencies as they relate to the IT Security/Information Assurance Specialized Job Activity

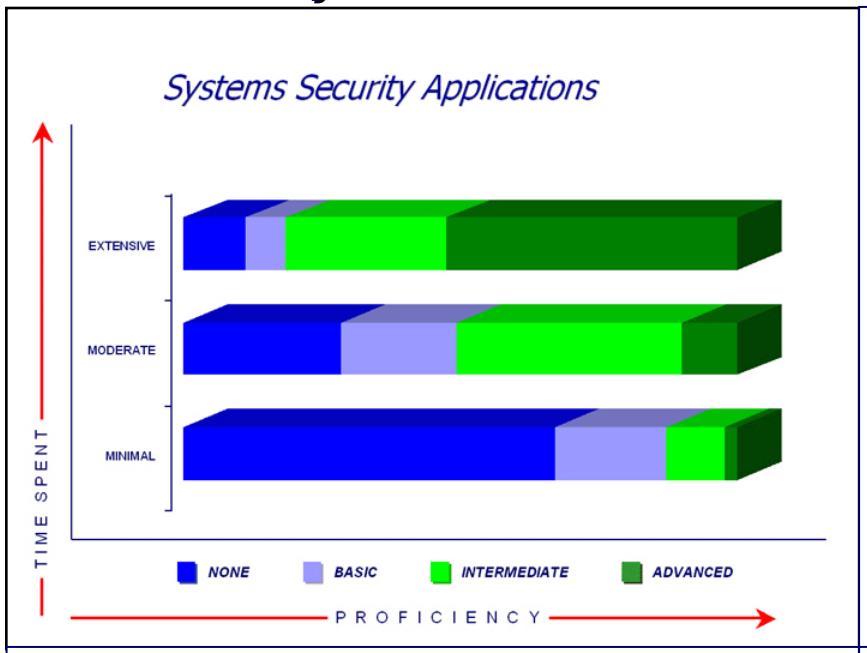


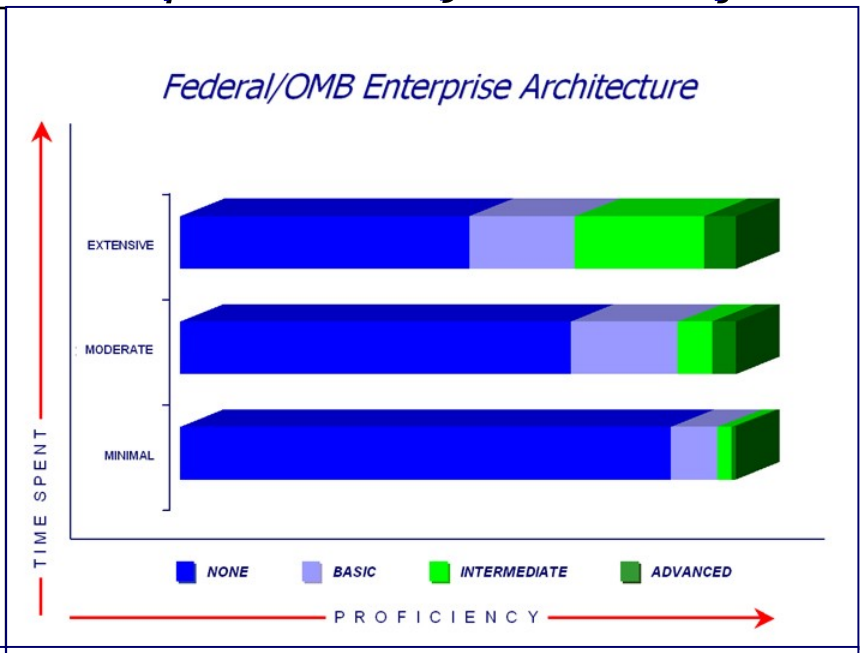
Results: IA-Related Skills

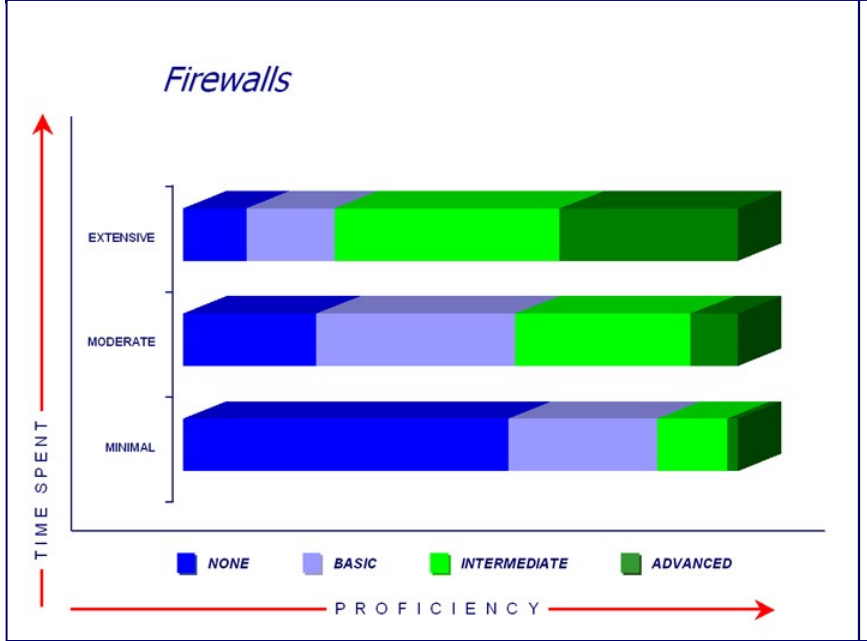
- Using a three point scale, respondents rated their current proficiency in a set of IA-related skills; table below shows average scores
- With a score of 1.5 being considered “average”, all IA-related skill proficiencies scored below average (DON workforce as a whole)

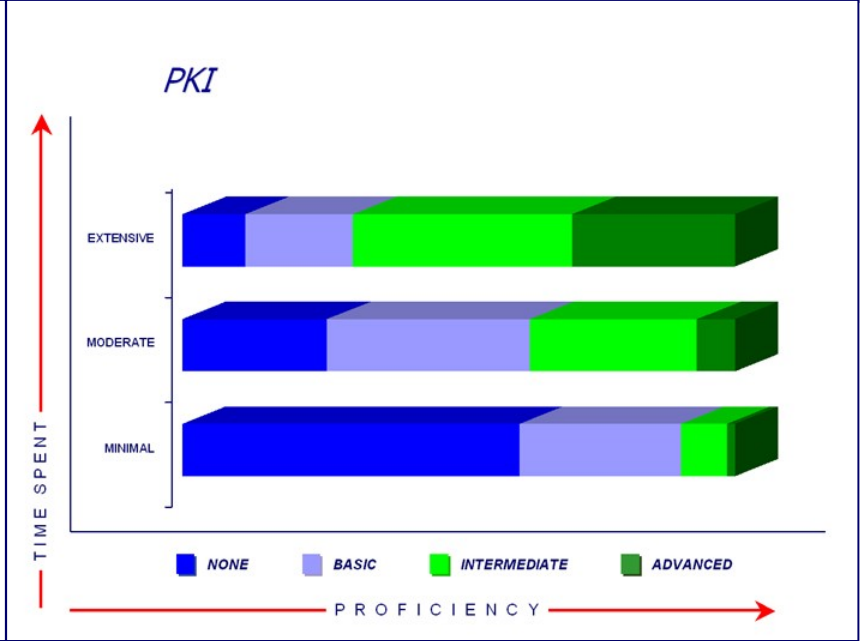
Skill	Average Score
Systems Security and User Administration	1.24
Network Protocols	1.20
Network Configuration and Implementation	1.13
Network Troubleshooting	1.13
Network Architecture and Design	1.09
NetworkTopology (general)	1.03
Systems Security Applications	1.01
Firewalls	0.99
PKI	0.92
Authentication	0.81
Encryption/Decryption algorithms	0.62
Cryptology	0.62
Biometrics	0.27

Sample Analysis of Skills as they relate to the IT Security/Information Assurance Specialized Job Activity









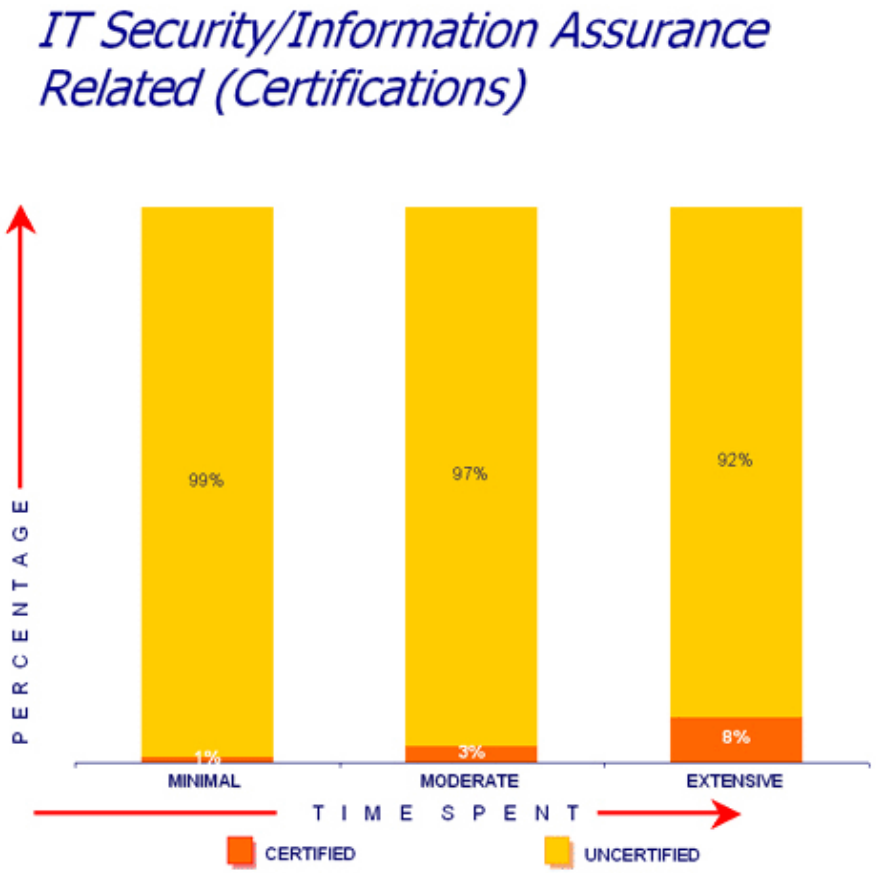
Results: IA Certifications

- Respondents were asked to indicate if they held a current certification in the Information Systems Security area*; few indicated a certification

Certificate Area	# Certified	% of Sample
Information Systems Security	38	2.85%

*The survey purposely avoided asking for discrete certifications and instead focused on certification areas (for example, “Cisco” vice “Cisco Certified Network Professional” as a discrete certification) because it was deemed that a current, reliable and validated list of certifications would be very difficult to compile.

Sample Detailed Analysis
IT Security/Information Assurance (Certifications)

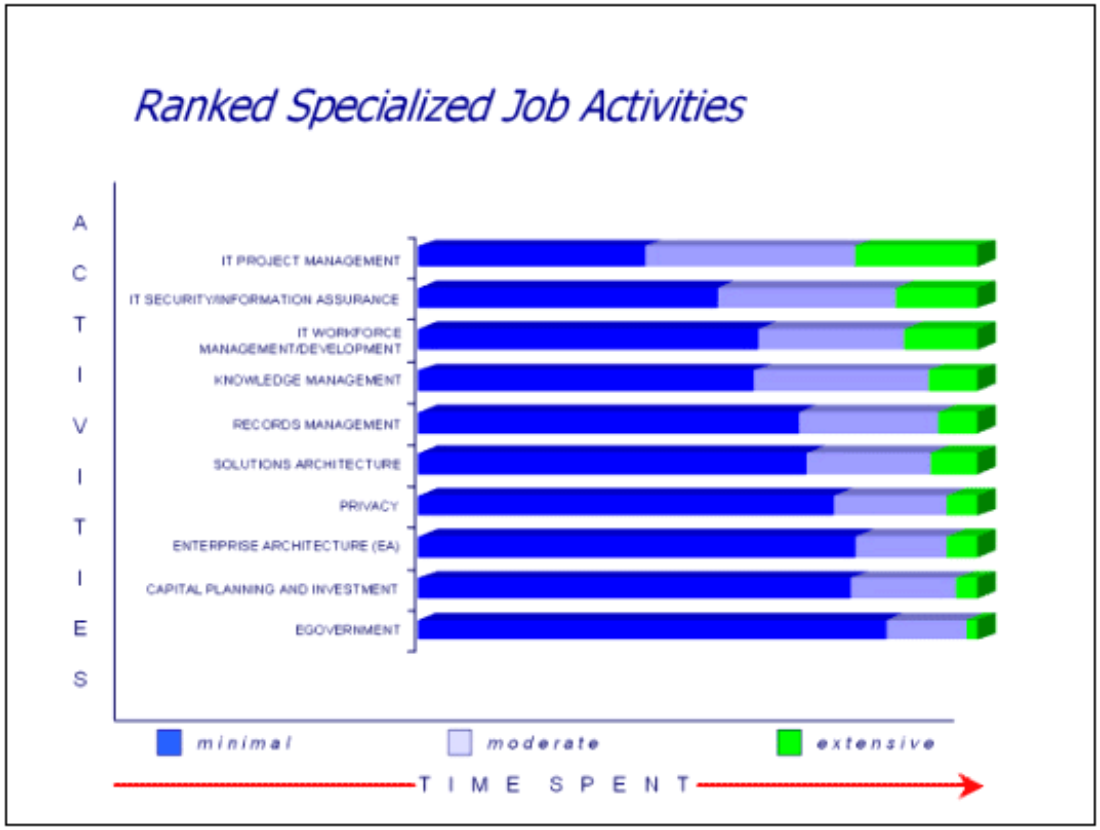


- *Looking across the extensive and moderate areas, **small numbers** of individuals performing IT Security/Information Assurance activities extensively actually possess a relevant certificate*

Specialized Job Activities

Ten specialized job activities were identified by experts as top IM/IT priorities

- **The survey asked respondents to estimate the amount of time they spend (extensive, moderate, or minimal or none) on ten key "specialized job activities"**
- **Top activities were weighted and ranked based on number of responses**
  - **IT Security/Information Assurance was ranked second in terms of the amount of time respondents spent on this activity**
- **Competencies, skills and certifications can be correlated to this job activity to better gauge how well the IA workforce is equipped to support the IA/IT enterprise**



Discussion of Marine Corps Responses

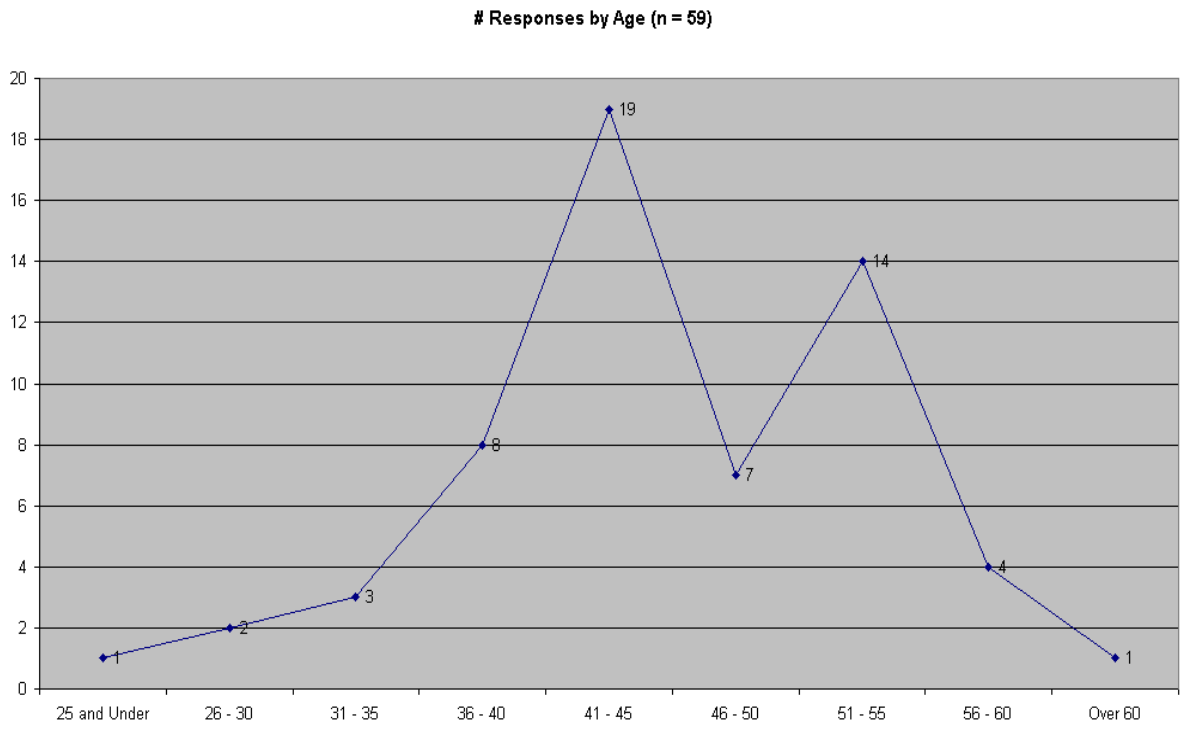
Profile of the "Typical IT Worker"

The "Typical" USMC IT Worker…
…is between 41 and 45 years of age
…is a GS-9
…has over 20 years of Federal Government experience
…has little to no private sector experience
…is likely to retire in the next 11 to 20 years
…holds a High School/GED diploma

- Total respondents: 59
- Represents 4 Percent of respondents
- Marine Corps population is less than 10 percent of the total DON IM/IT workforce
- ***Significantly different than other profiles – questionable use to make inferences about the Marine Corps IM/IT workforce***

Age

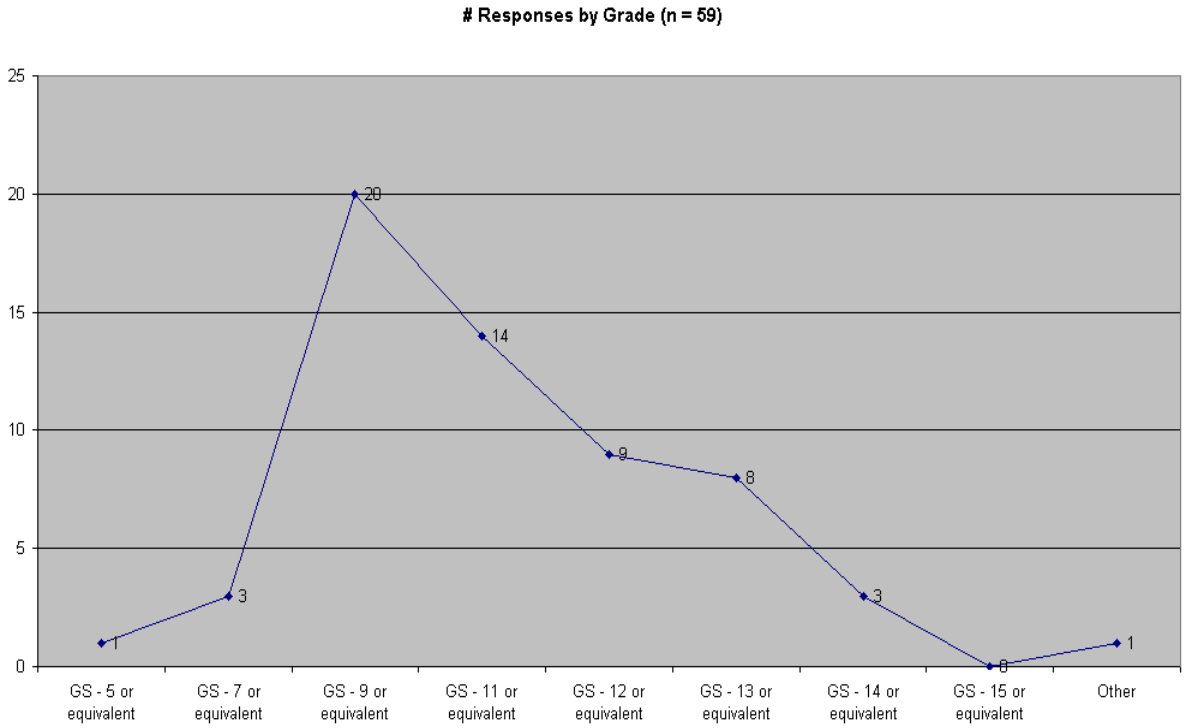
Reponses by Age		
Age Range	# Responses	%
25 and Under	1	1.69%
26 - 30	2	3.39%
31 - 35	3	5.08%
36 - 40	8	13.56%
41 - 45	19	32.20%
46 - 50	7	11.86%
51 - 55	14	23.73%
56 - 60	4	6.78%
Over 60	1	1.69%
Total	59	100.00%



- The most frequent age response was between 41 – 45 years of age (slightly lower than the DON as a whole)

Grade Level

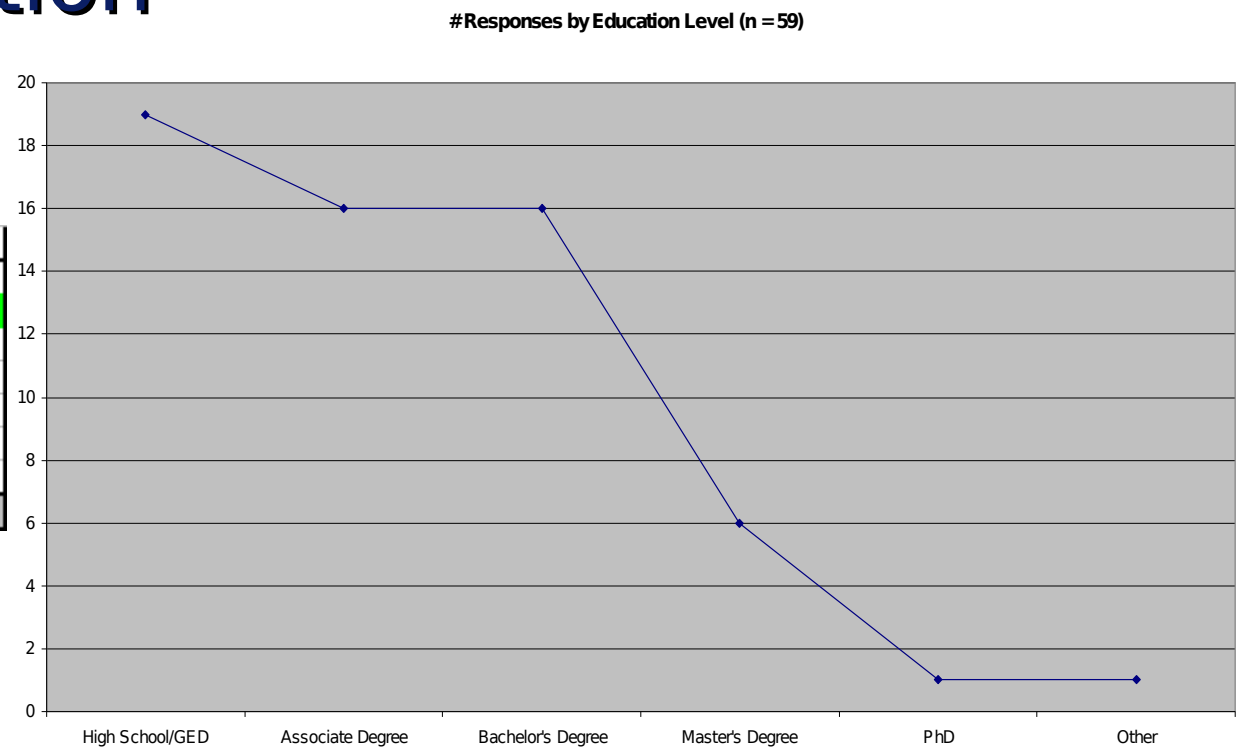
Grade Level		
Civil Service	# Responses	%
GS - 5 or equivalent	1	1.69%
GS - 7 or equivalent	3	5.08%
GS - 9 or equivalent	20	33.90%
GS - 11 or equivalent	14	23.73%
GS - 12 or equivalent	9	15.25%
GS - 13 or equivalent	8	13.56%
GS - 14 or equivalent	3	5.08%
GS - 15 or equivalent	0	0.00%
Other	1	1.69%
Total (GS)	59	100.00%



- The most frequent grade level response was GS-9 or equivalent
- Most frequent grade level for DON as a whole was GS-12 or equivalent

Education

Responses by Education Level		
Degree	# Responses	%
High School/GED	19	32.20%
Associate Degree	16	27.12%
Bachelor's Degree	16	27.12%
Master's Degree	6	10.17%
PhD	1	1.69%
Other	1	1.69%
Total	59	100.00%



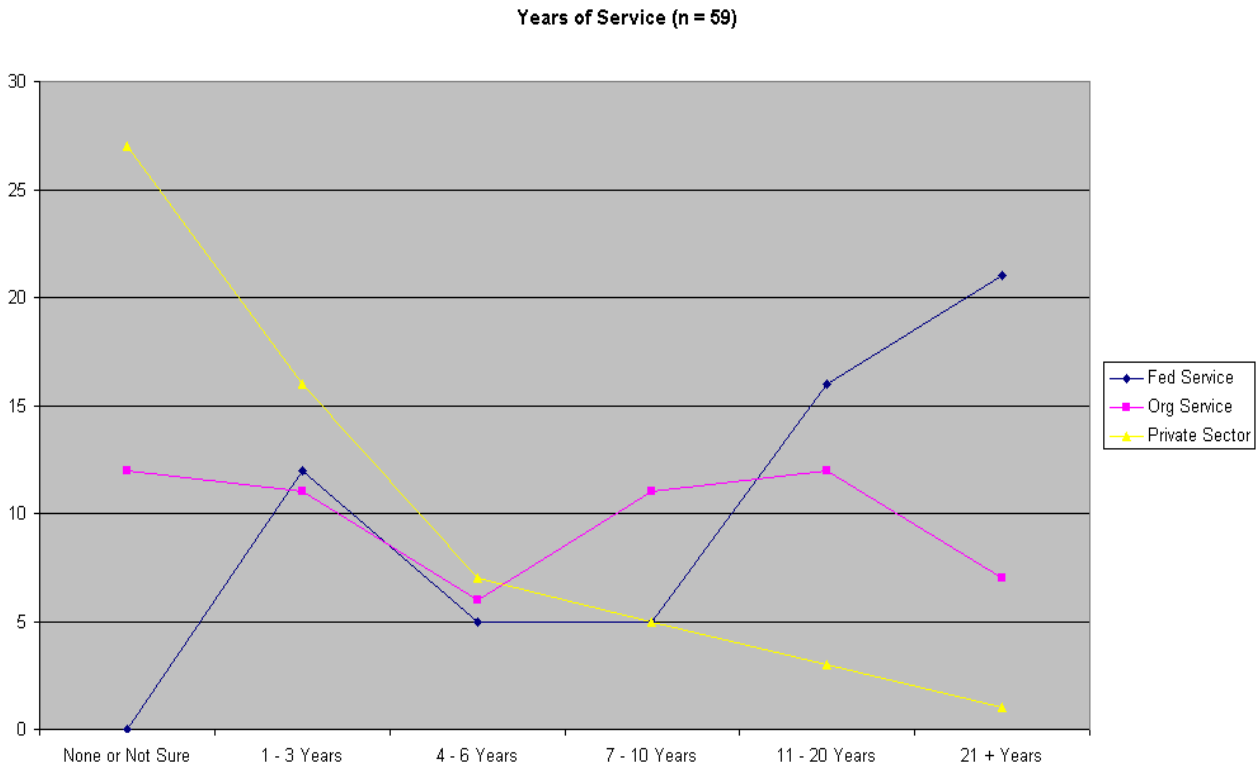
- The most frequent education level response was High School/GED
- Less than 12% indicating having post-Baccalaureate degrees
- DON as a whole responded with a higher percentage of Bachelor's and Master's degrees

Years of Service

Years of Federal Service		
Range	# Response	%
None or Not Sure	0	0.00%
1 - 3 Years	12	20.34%
4 - 6 Years	5	8.47%
7 - 10 Years	5	8.47%
11 - 20 Years	16	27.12%
21 + Years	21	35.59%
Total	59	100.00%

Years of Service in Organization		
Range	# Response	%
None or Not Sure	12	20.34%
0 - 3 Years	11	18.64%
4 - 6 Years	6	10.17%
7 - 10 Years	11	18.64%
11 - 20 Years	12	20.34%
21 + Years	7	11.86%
Total	59	100.00%

Years of Private Sector IT Experience		
Range	# Response	%
None or Not Sure	27	45.76%
1 - 3 Years	16	27.12%
4 - 6 Years	7	11.86%
7 - 10 Years	5	8.47%
11 - 20 Years	3	5.08%
21 + Years	1	1.69%
Total	59	100.00%

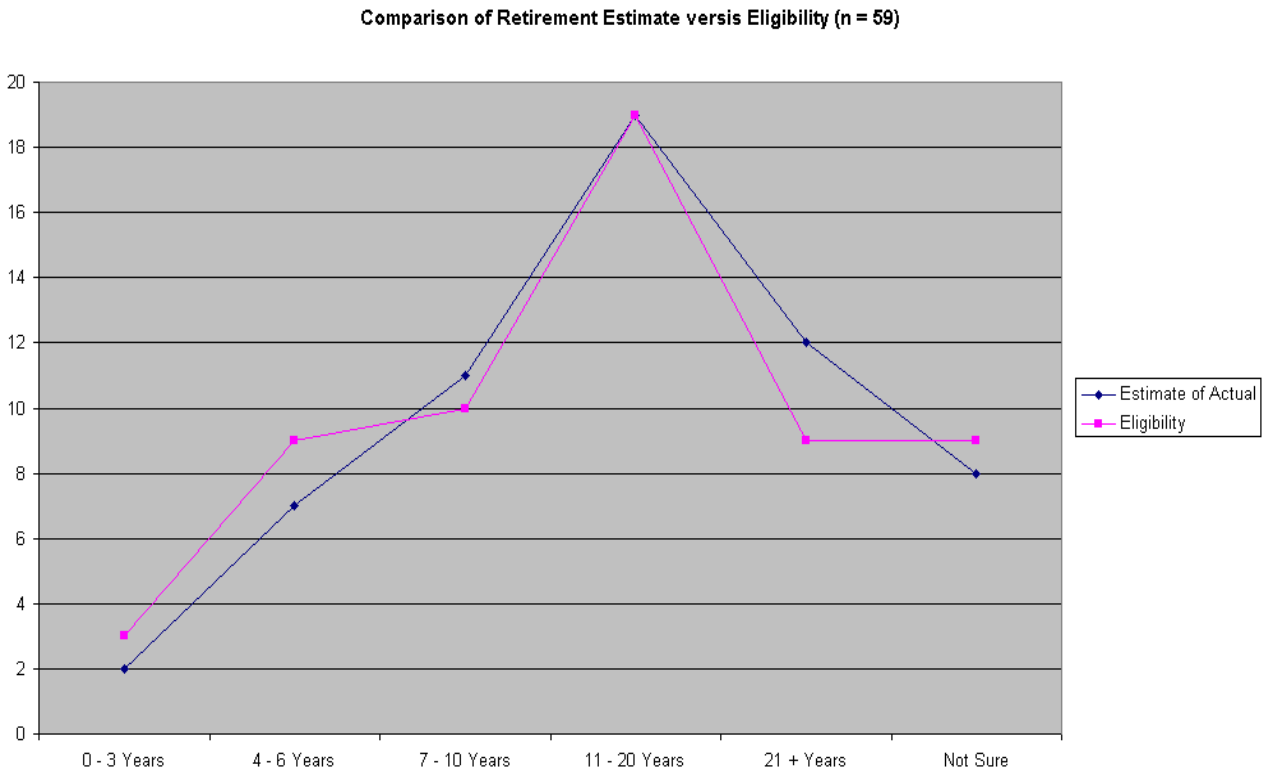


- While most respondents have a significant amount of Federal Government service, they are relatively new to their organization and have little private sector IT experience; ***compares similarly to the DON as a whole***

Retirement (Estimate of Actual vs. Eligibility)

Retirement Estimate		
Range	# Responses	%
0 - 3 Years	2	3.39%
4 - 6 Years	7	11.86%
7 - 10 Years	11	18.64%
11 - 20 Years	19	32.20%
21 + Years	12	20.34%
Not Sure	8	13.56%
Total	59	100.00%

Retirement Eligibility		
Range	# Responses	%
0 - 3 Years	3	5.08%
4 - 6 Years	9	15.25%
7 - 10 Years	10	16.95%
11 - 20 Years	19	32.20%
21 + Years	9	15.25%
Not Sure	9	15.25%
Total	59	100.00%



- There does not seem to be a disconnect between the estimate of when employees will actually retire versus when they are eligible to retire
- DON compares similarly, with a highlighted short-term difference

Competency Proficiencies Detail (Top 20 Technical)

- **The table below orders the top 20 technical competencies, based on average score (on a scale from 0 – 5)**

Technical Competencies	Proficiency						Average Score	Rank
	0 - None	1 - Basic	2 - Found.	3 - Interm.	4 - Advanced	5 - Expert		
Operating Systems	3	5	5	8	25	13	3.46	1
Hardware	3	5	3	17	20	11	3.34	2
Configuration Management	4	4	7	17	14	13	3.22	3
Knowledge Management	2	4	14	17	16	6	3.00	4
Database Management Systems	4	3	13	16	15	8	3.00	5
Operations Support	6	4	8	17	15	9	2.98	6
Project Management	5	7	5	17	21	4	2.92	7
Data Management	3	6	12	15	18	5	2.92	8
Information Assurance	3	8	11	14	16	7	2.90	9
Capacity Management	5	4	10	19	16	5	2.88	10
Database Administration	4	3	16	15	16	5	2.86	11
Infrastructure Design	7	5	8	15	18	6	2.85	12
Network Management	8	2	10	17	16	6	2.83	13
Technical Documentation	8	7	6	14	18	6	2.76	14
Systems Life Cycle	8	5	10	13	17	6	2.75	15
Quality Assurance	4	10	8	17	15	5	2.75	16
Distributed Systems	6	6	12	13	17	5	2.75	17
Technology Awareness	7	7	9	14	17	5	2.71	18
Systems Integration	6	7	13	10	18	5	2.71	19
Computer Languages	4	6	19	12	12	6	2.68	20

Competency Proficiencies Detail (Bottom 20 Technical)

- **The table below orders the bottom 20 technical competencies, based on average score (on a scale from 0 – 5)**

Technical Competencies	Proficiency						Average Score	Rank
	0 - None	1 - Basic	2 - Found.	3 - Interm.	4 - Advanced	5 - Expert		
Embedded Computers	25	12	11	7	2	2	1.24	53
Artificial Intelligence	19	18	8	8	3	3	1.44	52
Modeling and Simulation	19	8	16	13	2	1	1.56	51
Capital Planning and Investment Assessment	16	11	15	10	6	1	1.69	50
Human Factors	13	12	15	9	8	2	1.88	49
Logical Systems Design	14	10	15	10	9	1	1.88	48
Object Technology	13	8	19	12	4	3	1.92	47
Software Engineering	12	12	17	7	9	2	1.92	46
Information Technology Research & Development	9	16	14	12	6	2	1.93	45
Computer Forensics	13	12	13	7	10	4	2.02	44
Telecommunications	11	13	12	13	7	3	2.02	43
Cost-Benefit Analysis	12	9	15	11	11	1	2.05	42
Encryption	9	15	9	14	10	2	2.12	41
Business Process Reengineering	12	7	16	12	9	3	2.14	40
Risk Management	10	9	15	15	8	2	2.14	39
Accessibility	12	11	9	14	9	4	2.15	38
Information Systems Security Certification	11	12	9	11	13	3	2.20	37
Software Testing and Evaluation	8	10	14	18	6	3	2.22	36
Information Technology Performance Assessment	10	9	13	12	13	2	2.25	35
Process Control	11	7	13	14	10	4	2.29	34

Competency Proficiencies Detail (General - All)

- **The table below orders all 16 general competencies, based on average score (on a scale from 0 – 5)**

General Competencies	Proficiency						Average Score	Rank
	0 - None	1 - Basic	2 - Found.	3 - Interm.	4 - Advanced	5 - Expert		
Problem Solving	1	0	2	10	29	17	3.98	1
Interpersonal Skills	0	1	3	11	26	18	3.97	2
Customer Service	2	1	4	9	19	24	3.93	3
Leadership	0	2	7	9	24	17	3.80	4
Decision Making	1	1	5	13	24	15	3.75	5
Organizational Awareness	1	2	6	7	34	9	3.66	6
Planning and Evaluation	2	2	3	14	26	12	3.63	7
Oral Communication	1	1	5	20	21	11	3.56	8
Influencing/Negotiating	2	4	8	13	20	12	3.37	9
Administration and Management	4	6	9	16	18	6	2.95	10
Strategic Thinking	7	5	9	12	19	7	2.88	11
Managing Human Resources	10	3	9	11	15	11	2.86	12
Financial Management	10	5	11	16	13	4	2.49	13
Public Safety and Security	9	7	11	17	12	3	2.42	14
Legal, Government and Jurisprudence	7	10	13	17	9	3	2.34	15
Contracting/Procurement	13	8	10	19	7	2	2.08	16

Skill Proficiencies Detail (Top 20)

- **The table below orders the top 20 (out of 80) IT-related skills, based on average score (on a scale from 0 – 3)**

Skill	Proficiency				Average Score	Rank
	0 - None	1 - Basic	2 - Interm.	3 - Advanced		
Word Processing Software	4	5	20	30	2.29	1
Electronic Mail	8	7	16	28	2.08	2
Client-Server	7	11	15	26	2.02	3
File systems	9	6	20	24	2.00	4
Spreadsheet Software	10	4	25	20	1.93	5
Desktop Services	9	6	28	16	1.86	6
Network Protocols	8	13	22	16	1.78	7
Internet Browsers	12	9	21	17	1.73	8
Browsers	11	12	18	18	1.73	9
Systems Security and User Administration	13	9	19	18	1.71	10
Network Troubleshooting	12	10	20	17	1.71	11
Storage Devices	16	5	23	15	1.63	12
Network Configuration and Implementation	12	13	19	15	1.63	13
HTML	11	13	22	13	1.63	14
Data Analysis	11	14	21	13	1.61	15
Cabling	15	7	23	14	1.61	16
Desktop Publishing Software	13	10	24	12	1.59	17
Data Flow Diagrams	13	11	22	13	1.59	18
Understanding and translating user requirements	21	2	17	19	1.58	19
Network Architecture and Design	11	16	19	13	1.58	20

Skill Proficiencies Detail (Bottom 20)

- **The table below orders the bottom 20 (out of 80) IT-related skills, based on average score (on a scale from 0 – 3)**

Skill	Proficiency				Average Score	Rank
	0 - None	1 - Basic	2 - Interm.	3 - Advanced		
Biometrics	48	5	6	0	0.29	80
JAD	46	9	4	0	0.29	79
SEI Capability Maturity Models	47	7	5	0	0.29	78
UML	45	9	5	0	0.32	77
Virtual Reality	39	14	6	0	0.44	76
Federal/OMB Enterprise Architecture	39	14	5	1	0.46	75
Enterprise Portal Development	37	15	5	2	0.53	74
Portal Development	38	13	6	2	0.53	73
Animation	34	18	6	1	0.56	72
RAD	37	13	7	2	0.56	71
Prototyping	33	19	6	1	0.58	70
Cryptology	35	13	10	1	0.61	69
Sound Editing	35	14	8	2	0.61	68
Video Imaging	35	13	9	2	0.63	67
Encryption/Decryption algorithms	30	20	9	0	0.64	66
Enterprise Resource Planning	30	18	10	1	0.69	65
Reusable Modules	31	17	7	4	0.73	64
Telephony	34	10	10	5	0.76	63
4th generation language	33	9	12	5	0.81	62
Mid-level language	28	17	11	3	0.81	61

Findings and Next Steps

Conclusions of Survey

- Validates some of our assumptions and conclusions from 1999 enterprise-level workforce planning efforts
- Workforce appears to have adequate proficiency in IT-related competencies but lacks in-depth technical skills
  - Reflects the ability to manage complex jobs/activities without the need to understand underlying technology
  - Work less task-oriented so skills less important than competencies
- Not as critical concern regarding the workforce retiring en masse
- Need to focus on development of the current workforce to improve certain competencies and skills
- May want to increase partnerships with industry (IT Exchange Program) to increase the amount of private sector experience to develop specific competencies

Highlights the need for development and re-training due to low attrition indicated by
the survey and decreased demand for IT workers cited in the ITAA 2003 Workforce

Next Steps

- Further analyze survey results, focusing on evaluating competencies, skills and certifications and their DON-specific relationship to specialized job activities to develop enterprise level interventions
- Provide Navy and Marine Corps organizations their raw survey data and workforce planning guidance
- Incorporate findings to revise enterprise-level IT Workforce Strategic Human Capital Strategy
  - Results form baseline for “as is” state
  - Baseline critical to measuring change over time for future surveys

“Hiring and retaining skilled professionals” is the #2 rated challenge for IT organizations

(The Federal Chief Information Officer Eighth Annual Top Ten Challenges Survey, Association for Federal Information Resources Management, Nov 2003)

Federal Level Perspective

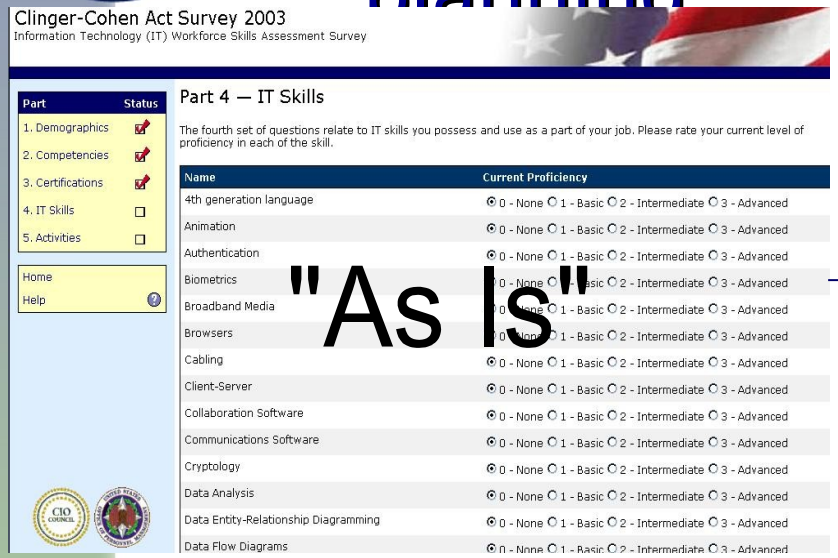
The CIOC and OPM conducted the CCA survey to ascertain the Federal Government's IT workforce baseline

- The CCA Survey satisfies Clinger-Cohen Act, Section 209 eGov Act and OMB BY 04 passback requirements
  - Because Clinger-Cohen Act stipulates an annual assessment requirement, the CIOC envisions repeating/reusing the survey instrument
  - Reuse of the instrument will facilitate comparative analysis over time, so that progress in efforts to strategically develop the Federal IT workforce may be ascertained
- The survey covered demographics, IT-related competencies and skills, certifications, and time spent on specialized job activities
- The survey was conducted federal-wide, thus avoiding duplication in agencies' development and administration costs
- The survey facilitates comparison among and between Agencies, due to a common set of analysis criteria (e.g., common demographic questions, competencies, skills, certifications and specialized job activities (SJAs))
- The survey was voluntary, anonymous, and self-selecting

CCA survey collected data only on the "as is" state, an assessment of gaps was not feasible

- The CCA survey helped to provide a picture of the Federal Government IT workforce baseline
  - Baseline data represents one component of workforce planning -- the "as is" state
  - Lacking a "to be", baseline data can be paired with other key indicators (e.g., OMB business case data, OPM's FedScope, FISMA, and/or Certification and Accreditation process) to determine risk areas/vulnerabilities
- The main criticism of the analysis of survey data was that it could not identify gaps. Ideally, data collected by the survey would be compared with a target (or "to be" state) to identify and/or quantify existing gaps
  - Targets are agency-specific due to varying missions and strategies to outsourcing various skill sets
  - Agency-specific targets can be aggregated or averaged to form a Federal-wide perspective
- Once gaps are quantified, specific mitigation strategies (interventions) that target gaps can then be identified and implemented
  - Gaps can be compared over time to evaluate effectiveness of intervention measures
  - Comparative analysis of gaps between agencies and agencies against the Federal aggregate can be performed

Enabling enterprise level and agency-specific human capital planning



"As Is"

"To Be"

Enterprise Level Certification % Requirements

Enterprise Level Skill Proficiency Requirements

Enterprise Level Competency Proficiency Requirements

Core	General	Writing	4 - Advanced
Core	Technical	Capital Planning and Investment Assessment	4 - Advanced
Core	Technical	Information Assurance	2 - Foundational
Core	Technical	Information Technology Performance Assessment	4 - Advanced
Core	Technical	Infrastructure Design	3 - Intermediate
Core	Technical	Knowledge Management	4 - Advanced
Core	Technical	Project Management	4 - Advanced
Core	Technical	Standards	3 - Intermediate
Core	Technical	Technology Awareness	4 - Advanced
Core	Technical	Telecommunications	3 - Intermediate
Recommended	General	Arithmetic	3 - Intermediate
Recommended	General	Computers and Electronics	3 - Intermediate
Recommended	General	Conflict Management	3 - Intermediate
Recommended	General	Contracting/Procurement	3 - Intermediate

"Gap"

- The first iteration of the CCA survey collected information regarding the Federal IT workforce baseline capabilities
- The next iteration could integrate additional elements of human capital planning to form a more robust picture of "gaps"
- This revised framework would allow each Agency Human Capital Officer and IT workforce expert to populate Agency-specific "to be" human capital planning elements…that when aggregated provides the CIOC, OPM and OMB an enterprise view of "to be" competencies, skills, certifications, and specialized job activities…

Backup Slides

Competency Assessment Methodology

- Respondents provided a self-assessment of their current proficiency in a set of 53 technical and 16 general competencies
  - These competencies represent a subset of those developed by OPM for the GS-2210 occupational series that were chosen because of their applicability to other IT-related occupational series
  - The Federal CIO Council worked with Subject Matter Experts from various Departments/Agencies to determine which of the competencies were “most important;” 22 technical competencies and 9 general competencies were selected
  - The majority of the “most important” competencies correlate to the 10 specialized job activities considered to be the most critical for the federal IT workforce
- A six-point rating scale was used for the self-assessment:
  - 0 – None
  - 1 – Basic
  - 2 – Foundational
  - 3 – Intermediate
  - 4 – Advanced
  - 5 – Expert

Technical Competencies

- The following technical competencies were included in the survey; an asterisk indicates an "important" competency

- Accessibility
- Artificial Intelligence
- Business Process Reengineering*
- Capacity Management
- Capital Planning and Investment Assessment*
- Computer Forensics
- Computer Languages
- Configuration Management*
- Cost-Benefit Analysis*
- Data Management*
- Database Administration
- Database Management Systems*
- Distributed Systems
- Electronic Commerce (e-Commerce)*
- Embedded Computers
- Encryption*
- Hardware
- Hardware Engineering
- Human Factors*
- Information Assurance*
- Information Resources Strategy and Planning*
- Information Systems Security Certification*
- Information Systems/Network Security*
- Information Technology Architecture*
- Information Technology Performance Assessment
- Information Technology Research & Development
- Infrastructure Design*
- Knowledge Management*
- Logical Systems Design
- Modeling and Simulation
- Multimedia Technologies
- Network Management
- Object Technology
- Operating
- Operations Support
- Organizational Development
- Process Control
- Product Evaluation*
- Project Management*
- Quality Assurance
- Requirements Analysis*
- Risk Management*
- Software Development
- Software Engineering
- Software Testing and Evaluation
- Standards*
- System Testing and Evaluation
- Systems Integration
- Systems Life Cycle*
- Technical Documentation
- Technology Awareness*

General Competencies

- The following general competencies were included in the survey; an asterisk indicates the competencies deemed most important

- Administration and Management*
- Contracting/Procurement*
- Customer Service*
- Decision Making*
- Financial Management*
- Influencing/Negotiating
- Interpersonal Skills
- Leadership
- Legal, Government and Jurisprudence*
- Managing Human Resources*
- Oral Communication
- Organizational Awareness*
- Planning and Evaluation
- Problem Solving
- Public Safety and Security
- Strategic Thinking*

Skill Assessment Methodology

- Respondents provided a self-assessment of their current proficiency in a set of 80 IT-related skills
  - The skills were chosen by subject matter expert focus groups facilitated by OPM
  - "Vendor-neutral" skills were used to the extent possible
  - The Federal CIO Council worked with Subject Matter Experts from various Departments/Agencies to determine which of the skills were deemed "most important" to successful job performance; 21 skills were selected
  - The majority of the "most important" skills correlate to the 10 specialized job activities considered to be the most critical for the federal IT workforce
- A four-point rating scale was used to assess skill proficiency (differing from the six-point scale used for competencies):
  - 0 – None
  - 1 – Basic
  - 2 – Intermediate
  - 3 – Advanced

Skills

- The following skills were included in the survey; an asterisk indicates a "most important" skill

- 4th generation language
- Animation
- Authentication*
- Biometrics*
- Broadband Media
- Browsers
- Cabling
- Client-Server
- Collaboration Software
- Communications Software
- Cryptology*
- Data Analysis*
- Data Entity-Relationship Diagramming
- Data Flow Diagrams
- Debugging tools
- Desktop Publishing Software
- Desktop Services
- Develop Functional Specifications
- Development System Analysis*
- Development Toolkits
- Document Management*
- Electronic Mail*
- Encryption/Decryption algorithms
- Enterprise Directory Services
- Enterprise Portal Development
- Enterprise Resource Planning
- Federal/OMB Enterprise Architecture*
- File systems*
- Firewalls*
- Flowcharting
- FTP servers
- Groupware*
- HTML
- HTTP (generic)
- Internet Browsers
- JAD
- Low-level language
- Mainframe
- Mid-level language
- Network Architecture and Design*
- Network Configuration and Implementation*
- Network Protocols
- Network Troubleshooting
- Network Voice/Data Integration
- Network Topology (general)
- Object-Oriented Languages
- Personal Digital Assistants
- PKI*
- Portal Development*
- Process Design
- Programming Concepts
- Project Management Software*
- Prototyping
- RAD
- Records Management*
- Reusable Modules*
- Scripting
- SEI Capability Maturity Models
- Sound Editing
- Spreadsheet Software
- SQL (generic)
- Statistical Software
- Storage Devices
- Structured Analysis
- Structured Design
- Systems Security and User Administration*
- Systems Security Applications*
- Telephony
- Test Acceptance Testing
- UML
- Understanding and translating user requirements*
- UNIX (generic)
- Video Imaging
- Virtual Reality
- Web Design
- Web Editing Software
- Web Graphics Design
- Web Site Management
- Wireless Technologies
- Word Processing Software

Certification Methodology

- Respondents were asked to indicate broad ***certification areas*** in which they currently possess a recent (within the past three years) certification
- The survey focused on certification areas and not discrete certifications (for example, “Cisco” as an area as opposed to “Cisco Certified Network Professional” as a discrete certification)
- The survey distinguished between certifications validated by an independent authority, which included experience as part of the certification requirements, and certificate programs generally offered by vendors upon completion of a given set of coursework; respondents were instructed to indicate only certification areas that included experience as part of the certification criteria

Certifications

- The following certification areas were included in the survey:

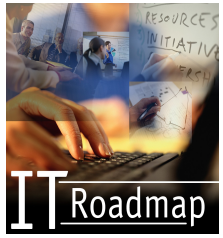
- IT Related Technical Certificates from accredited Technical Schools (military or commercial)
- Banyan
- Business Applications
- Certified Web Professional
- Check Point
- CIO
- Cisco
- Citrix
- Comp TIA
- Compaq
- Computing
- Data Base
- Data Processing
- Dell
- DGC Mux Certification
- Document Imaging
- Engineering
- Evidence Collection
- GIAC
- GSA 1000 by 2000 Certification
- Healthcare
- IBM
- IDNX Certification
- Information Systems
- Information Systems Security
- Java
- Linux
- Lotus
- Lucent
- Mechanical
- Microsoft
- Netware
- Network Security
- Network Support
- Novell
- Oracle
- Project Management
- Quality
- Red Hat
- SCO
- Software Development
- Training
- USDA Graduate School Webmaster Certification
- Web

Overview of the Federal IT (Workforce Development) Roadmap

IT Roadmap Background

- Developed by the Federal Chief Information Officers (CIO) Council, Workforce and Human Capital for IT Committee
- Based on DON CIO Career Planning Tool
- Adapted by the Office of Personnel Management for the Gov Online Learning Center
- Intended for all government civilian IT workers (predominantly the GS-2210 IT Management Specialist)
- Will incorporate IT Project Management specialty once released by OPM
- Released September 2003:
  - http://itroadmap.golearn.gov

IT Roadmap Features



- Defines the 10 parenthetical (specialty titles) for the GS-2210 IT Management Specialist
- Outlines 97 general and technical competencies
  - Maps competencies to parenthetical titles at four performance levels (entry, intermediate, full performance, senior expert)
  - Maps behaviors to competencies at five proficiency levels (basic, foundational, intermediate, advanced, expert)
- Lists over 400 professional development opportunities and links them to competencies
- Allows users to conduct a self-assessment of competencies and compare their assessment to various parenthetical titles; also allows them to have a third party, independent (e.g., supervisor, mentor) provide an assessment
- Allows users to build long-term career development plans
- Provides various management-level, aggregate reports